

**INTERPRETATION IC 90.1-2013-11 OF
ANSI/ASHRAE/IES STANDARD 90.1-2013
Energy Standard for Buildings Except Low-Rise Residential Buildings**

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Reference: This request for interpretation refers to the requirements presented in ANSI/ASHRAE/IES Standard 90.1-2013, Section 6.5.3.1.2, relating to motor nameplate horsepower.

Background: Electronically commutated motors (ECM) are becoming very popular with equipment manufacturers, design professionals, and building operators. With this popularity, manufacturers have developed motors of increasing size and power enabling them to be used in more applications such as in pumps and air handling units. In addition, these motors have begun to be produced in larger horsepower making them more attractive for use in rooftop units and air handlers.

The current COMCHECK program will give a project a non-compliance flag in an ECM application when the system brake horsepower falls in the lower range of the ECM horsepower size options. The issue is the difference between NEMA induction motor horsepower options and ECM horsepower options. The following table shows this difference:

BHP Range	Nameplate NEMA HP	BHP Range	Nameplate ECM Size
Up to 0.66	1	Up to 0.87	1.3 hp or 1 kW
0.67 to 0.99	1.5	0.88 to 1.53	2.3 hp or 1.7 kW
1.00 to 1.33	2	1.54 to 2.66	4 hp or 3 kW
1.34 to 1.99	3	2.67 to 5.33	8 hp or 6 kW
2.00 to 3.33	5	5.34 to 9.00	12 hp or 9 kW
3.34 to 4.99	7.5		
5.00 to 7.69	10		
7.70 to 11.25	15		

Since the range of the ECMs are larger than the induction motors there are fewer size options, COMCHECK will flag the project with non-compliance with paragraph 6.5.3.1.2.

The irony of this is the fact that the ECM motors are actually more efficient at part load than induction motors.

Interpretation No.1: The requirement in 6.5.3.1.2 applies to induction motors and to electronically commutated motors (ECM) that have permanent magnet rotors. When induction motors are used then the requirement is to use the next available NEMA nameplate horsepower motor and when ECMs are used the requirement is to use the next available ECM nameplate horsepower motor

Question No.1: Is this interpretation correct?

Answer No.1: Yes.

Interpretation No.2: This interpretation applies to ANSI/ASHRAE/IES Standard 90.1-2010.

Question No.2: Is this interpretation correct?

Answer No.2: Yes.

Interpretation No.3: This interpretation applies to ANSI/ASHRAE/IES Standard 90.1-2007.

Question No.3: Is this interpretation correct?

Answer No.3: Yes.

Comments: The clause 6.5.3.1.2 originated when only induction motors were prevalent for fans ≥ 1 HP (0.746 kW) shaft power. Appropriate matching of induction motors to their loads remains important to ensure good fan system efficiency.

Permanent magnet fan motors, when compared to induction motors, however, have overall higher efficiency, especially under part-load conditions. In addition, there is a self-regulating effect for right-sizing permanent magnet motors because of the higher marginal cost if an ECM is oversized, as opposed to an oversized induction motor.